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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,782	06/11/2003	Paul Silinger	H0002233 US - 4018/H9925-	2472
62993	7590	01/29/2008	EXAMINER	
BUCHALTER NEMER 18400 VON KARMAN AVE. SUITE 800 IRVINE, CA 92612			VAN, LUAN V	
			ART UNIT	PAPER NUMBER
			1795	
			MAIL DATE	DELIVERY MODE
			01/29/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/765,782	SILINGER ET AL.	
	Examiner	Art Unit	
	Luan V. Van	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/4/07</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 7, 2008 has been entered.

Response to Amendment

Applicant's amendment of January 7, 2008 does not render the application allowable.

The amendment is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: Claims 1-14 are amended to recite the limitations of "a plurality of upper shields" and "a plurality of lower shields". A plurality suggests that there can be more than two. However, there is no evidence in the applicant's specification to support that the upper channel can have more than two shields or that the lower channel can have more than two shields. The specification discloses that there are only two shields in the upper channel and in the lower channel

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as shown in figure 2. The specification, therefore, does not provide a clear indication to support the amended limitations. Applicant is required to cancel the new matter in the reply to this Office Action.

Status of Objections and Rejections

All rejections from the previous office action are withdrawn in view of Applicant's amendment. New grounds of rejection under 35 U.S.C. 103(a) are necessitated by the amendments.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1-14 are amended to recite the limitations of "a plurality of upper shields" and "a plurality of lower shields". A plurality suggests that there can be more than two. However, there is no evidence in the applicant's specification to support that the upper channel can have more than two shields or that the lower channel can have more than two shields. The specification discloses that there are only two shields in the upper

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channel and in the lower channel as shown in figure 2. The specification, therefore, does not provide a clear indication to support the amended limitations.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over The Admitted Prior Art (figure 1 of the applicant's specification) in view of Akino et al. (JP pub 08-296086).

Regarding claim 1, The Admitted Prior Art teaches a plating system comprising: an elongated upper channel and an elongated lower channel (shown in Prior Art Fig. 1 of the disclosure); and a plating solution sparger 11 in Fig. 1 comprising a series of

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inlets oriented to direct any plating solution flowing through the inlets into one and towards another of the upper and lower channels.

The Admitted Prior Art differs from the instant claims in that the reference does not explicitly teach the horizontal sparger of the instant claim.

Akino et al. teach a hydraulic nozzle 7 (i.e., horizontal sparger, figure 1) to permit the flow of electrolyte towards the cathode in a plane substantially coplanar with the cathode. Plating thickness uniformity is attained in this configuration (paragraph 14).

Since the plating electrolyte is introduced by the hydraulic nozzle of Akino et al. directly into the lower channel, the plating electrolyte is displaced from the lower channel to the upper channel as the plating electrolyte is continuously introduced into the plating tank. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of The Admitted Prior Art by using the horizontal sparger of Akino et al., because it would permit the substrate to receive fresh electrolyte, thus improving the plating thickness uniformity. Furthermore, since Akino et al. teach that a configuration having a nozzle inlet to direct fluid into the lower channel would plate a substrate having a uniform plating thickness, it would have been obvious to one having ordinary skill in the art to have modified the sparger of The Admitted Prior Art with the nozzle inlet of Akino et al. in order to electroplate a substrate having a uniform plating thickness.

Regarding claim 2, The Admitted Prior Art teaches the system of further comprising: an anode 14; and a substantially planar cathode 90 comprising a first conductive surface, a second conductive surface, and a perimeter edge, the first

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conductive surface and second conductive surface being substantially parallel to each other and positioned on opposite sides of the cathode; wherein the sparger 11 is positioned at least as close to the perimeter edge of the cathode as to either of the first or second conducting surface (see Fig. 1).

Regarding claim 3, the system from the combination of The Admitted Prior Art and Akino et al. would enable the sparger to direct the plating solution towards the cathode in a plane substantially coplanar with the cathode.

Regarding claim 4, The Admitted Prior Art teaches each of the upper and lower channels comprises two substantially planar and parallel non-electrically conductive sides (page 1, lines 17-18, applicant's disclosure) that are substantially parallel to the cathode; and the cathode is positioned at least partially within each of the upper and lower channels between the non electrically conductive sides (see Fig. 1).

Regarding claim 5, The Admitted Prior Art teaches the upper and lower channels are positioned opposite each other and are separated from each other, the separation between the channels forming a pair of solution egress slots (see Fig. 1); and the channels are adapted to prevent current from flow between the anode and cathode other than through the egress slots (see Fig. 1).

Regarding claim 6, The Admitted Prior Art teaches the egress slots are positioned approximately parallel to a center line of the cathode (see Fig. 1).

Regarding claim 7, the apparatus of The Admitted Prior Art is structurally capable of plating a cathode comprising a dielectric substrate and conductive surfaces.

Regarding claims 8, 10, 11 and 14, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have recognized that the distance between the shield and the cathode affects the degree in which the electric field lines, extending from the anode to the cathode, reach the edge of the cathode or substrate. It is understood to one having ordinary skill in the art that charge buildup tends to occur at edges of the cathode substrate, causing a greater concentration of material deposition to occur in these areas and thus resulting in nonuniformity of the electroplated metal on the substrate. It would have been obvious to one having ordinary skill to have modified the distance between the shield and the cathode of The Admitted Prior Art through routine experimentation in order to prevent charge buildup at the cathode substrate edges and thus reducing nonuniformity in the electroplated metal. Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have reduced the distance between the shield and the cathode of The Admitted Prior Art, because electroplating apparatus can be made to occupy less space.

Regarding claim 13, The Admitted Prior Art teaches the upper channel and lower channel are separated by a distance. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of The Admitted Prior Art by varying the distance, because it would allow substrates of different sizes to be uniformly electroplated.

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akino et al. in view of The Admitted Prior Art.

Regarding claim 1, Akino et al. teach plating system comprising: an elongated upper channel formed by a plurality of upper shields 4 (figure 1) and an elongated lower channel formed by a plurality of lower shields 5, wherein each channel is separated by a gap between the upper and lower shields; and the plating solution horizontal sparger 7 oriented to direct any plating solution flowing through the inlet directly into one and towards another of the upper and lower channels.

Akino et al. differ from the instant claims in that the reference teaches a single inlet but does not explicitly teach whether there is a series of them.

The Admitted Prior Art teaches a series of inlets to permit a plating solution to flow into the vertical spargers (figure 1).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Akino et al. by using the series of inlets of The Admitted Prior Art, because the additional inlets would distribute the plating solution along the length of the substrate to permit the whole substrate to receive fresh electrolyte, thus enabling a uniform plating thickness.

Regarding claim 2, Akino et al. teach the system of further comprising: an anode 2; and a substantially planar cathode 3 comprising a first conductive surface, a second conductive surface, and a perimeter edge, the first conductive surface and second conductive surface being substantially parallel to each other and positioned on opposite sides of the cathode; wherein the sparger 7 is positioned at least as close to the

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perimeter edge of the cathode as to either of the first or second conducting surface (see Fig. 1).

Regarding claim 3, the sparger of Akino et al. directs the plating solution towards the cathode in a plane substantially coplanar with the cathode.

Regarding claim 4, Akino et al. teach each of the upper and lower channels comprises two substantially planar and parallel non-electrically conductive sides that are substantially parallel to the cathode; and the cathode is positioned at least partially within each of the upper and lower channels between the non electrically conductive sides (see Fig. 1).

Regarding claim 5, Akino et al. teach the upper and lower channels are positioned opposite each other and are separated from each other, the separation between the channels forming a pair of solution egress slots (see Fig. 1); and the channels are adapted to prevent current from flow between the anode and cathode other than through the egress slots (see Fig. 1).

Regarding claim 6, Akino et al. teaches the egress slots are positioned approximately parallel to a center line of the cathode (see Fig. 1).

Regarding claim 7, the apparatus of Akino et al. is structurally capable of plating a cathode comprising a dielectric substrate and conductive surfaces.

Regarding claims 8, 10, 11 and 14, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have recognized that the distance between the shield and the cathode affects the degree in which the electric field lines, extending from the anode to the cathode, reach the edge of the cathode or

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substrate. It is understood to one having ordinary skill in the art that charge buildup tends to occur at edges of the cathode substrate, causing a greater concentration of material deposition to occur in these areas and thus resulting in nonuniformity of the electroplated metal on the substrate. It would have been obvious to one having ordinary skill to have modified the distance between the shield and the cathode of Akino et al. through routine experimentation in order to prevent charge buildup at the cathode substrate edges and thus reducing nonuniformity in the electroplated metal.

Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have reduced the distance between the shield and the cathode of Akino et al., because electroplating apparatus can be made to occupy less space.

Regarding claim 13, Akino et al. teach the upper channel and lower channel are separated by a distance. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Akino et al. by varying the distance, because it would allow substrates of different sizes to be uniformly electroplated.

Response to Arguments

Applicants' arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

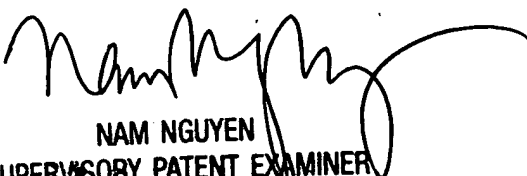
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan V. Van whose telephone number is 571-272-8521. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LVV
January 24, 2008


NAM NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700